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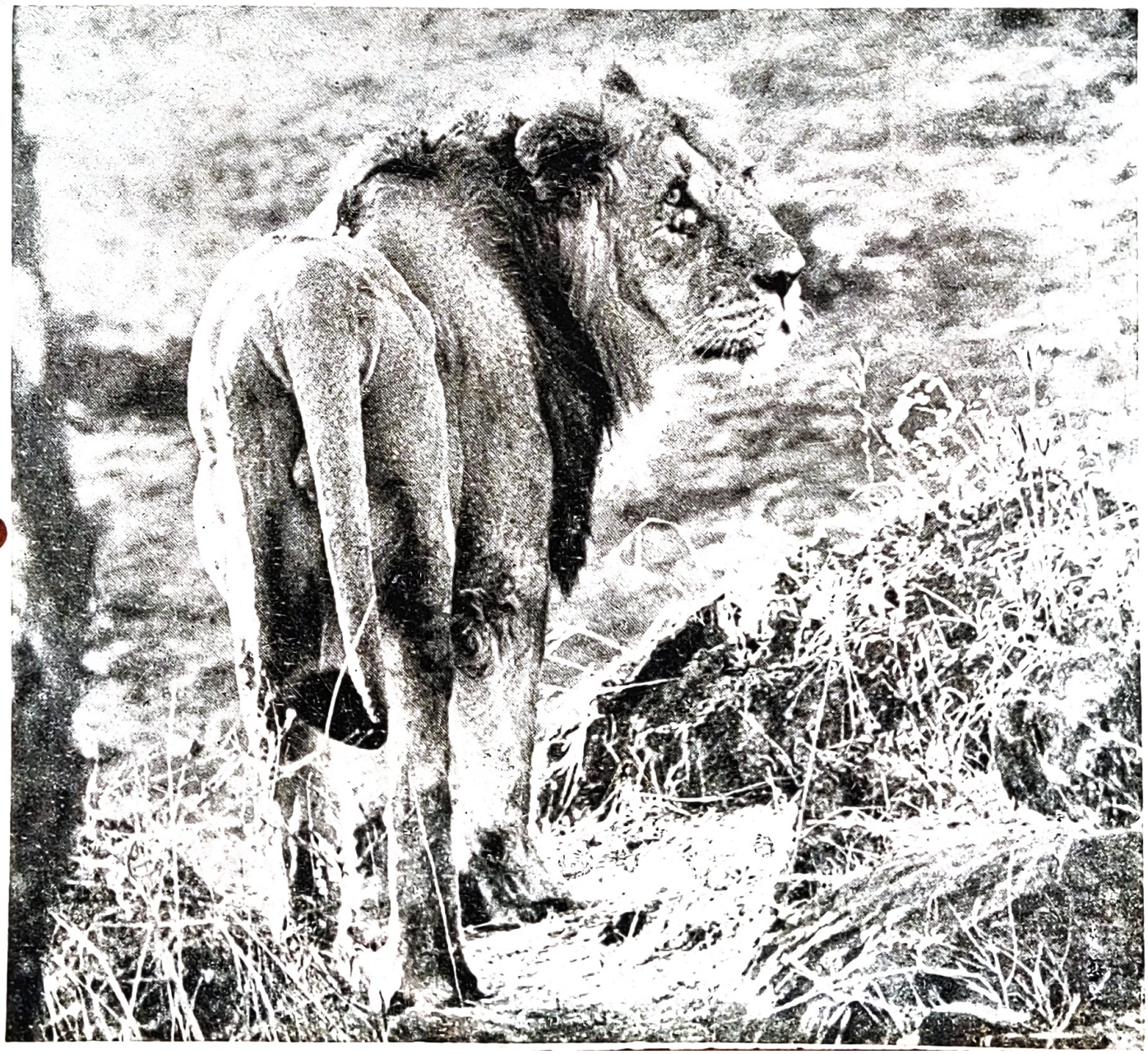
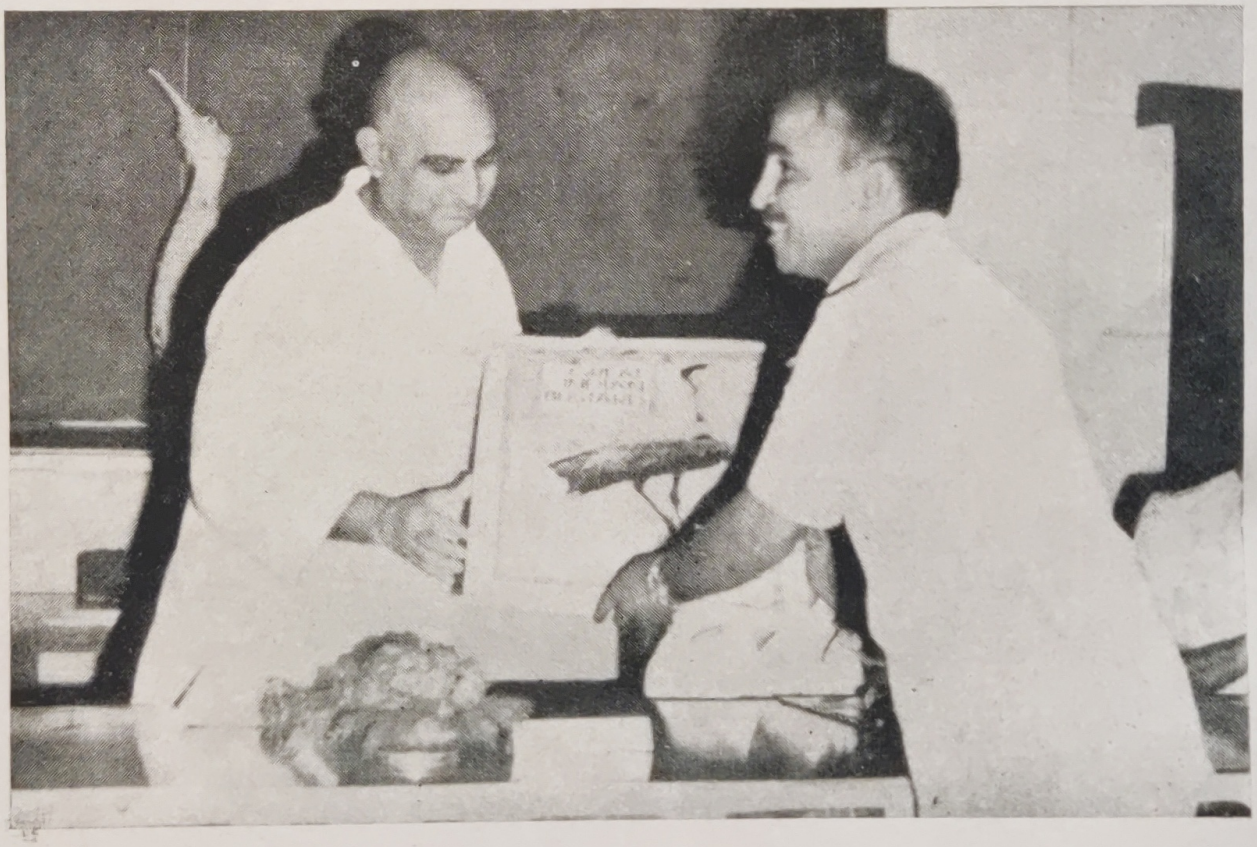
Monarch of Gir —Photo by Rajesh Bedi



Pastures anew ! Indeed DPAP works and growing of pastures as a result, have caused reappearance of Great Indian Bustards in scrub land zone of Solapur in Maharashtra. Photo shows Mr. S.P. Gabale, a forest officer, at the Bustard habitat in June, 1980.

—Photo by Harsh Vardhan



Union Agriculture Minister, Rao Birendra Singh, releasing the Sticker of Great Indian Bustard at the Indian National Science Academy Hall in New Delhi on 22nd August, 1980. Mr. Vishwambhar Modi, Joint Secretary of TWSI, is seen receiving it.

CONTENTS

1.	Messages	...	1
2.	Rao Birendra Singh Releases 'GIB' Sticker	...	2
3.	The Bustard in India by Dharmakumarsinhji	...	3
4.	A Little Success for the Big Bird by Graham Pizzey	...	5
5.	First Successful Captive Breeding of the Great Bustard (*Otis tarda*) by Wolfgang Gewalt	...	8
6.	Why Great Indian Bustard ? by Harsh Vardhan	...	9
7.	Arabian Bustard Expedition, April 1977 by Ben King	...	11
8.	Her Name are Many	...	12
9.	How Many Bustards ?	...	13
10.	Bane of Conservation—The Pretentious Preacher by S.R. Chaudhury		14
11.	Game Farming and Harvesting of Wildlife Products through Village Panchayats and Tribal Cooperatives by M.A. Rashid	...	16
12.	Kokkre Bellur Pelicanry by V.S. Saxena, I.F.S.	...	20
13.	African Ivory Trade in India by K. Prasad, I.F.S.	...	25
14.	Birds-Eye View of Australian Birds	...	30
15.	Ecosystem of Butterflies in a Region by Sasadhar De	...	32
16.	Vanishing Glory of Shivpuri District—The Great Indian Bustard *Choriotis nigriceps* (Vigors) by R.K. Shukla, I.F.S.	...	36

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Rao Birendra Singh Releases 'GIB' Sticker

Rao Birendra Singh, Union Agriculture Minister, released the Stickers of the Great Indian Bustard, an endangered species of bird, on 22nd August at a function in New Delhi organised by the Tourism and Wildlife Society of India (TWSI). Dr. Nagendra Singh, Judge at the International Court of Justice, presided.

The Minister lauded TWSI's efforts in a voluntary manner to have dared to work for holding the international symposium on Bustards at Jaipur in November this year. He pleaded for strict penalty to be awarded to poachers of wildlife and those felling trees. The future of wildlife's survival in the country is bright as Prime Minister, Mrs. Indira Gandhi herself takes keen interest in such programmes and is now the Chairman of the Wildlife Advisory Board as well as the Project Tiger, he added.

Dr. Nagendra Singh, Life Member, Wildlife Preservation Society of India, (Dehra Dun) said Mrs. Gandhi's party has underlined the importance of conservation of flora and fauna in its menifesto which was a most welcome sign. She had declared her faith for such issues in her address at the Stockholm Conference also. Much could be sought in this regard by involving the voluntary organisations.

Mr. Digvijaisinhji, Life Member, Wildlife Preservation Society of India Dehra Dun MP, gave a talk on Great Indian Bustard at this function and remarked that it was unfortunate that natural resources were dwindling and environment had been greatly disturbed. Having raised this issue in the Lok Sabha on 11 August, 1980, he reminded the people to become committed on such matters.

Mr. Harsh Vardhan, General Secretary of TWSI, gave a resume of its activities and disclosed that Mrs. Gandhi had herself questioned about the plight of Great Indian Bustards in a short talk with him four years ago. TWSI was an agency to implement such policies and help the nation, he added. The vote of thanks was proposed by Mr. R.K. Khetan, Treasurer of TWSI.

A large number of school children, Jt. Secretary, Wildlife, Inspector General of Forests and others took part in the function. The GIB Stickers are to generate a mass consciousness among people in favour of preservation of this endemic species, now to be spotted out very rarely in the country.

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The Bustard in India

By

Dharmakumarsinhji

I refer to the Great Indian Bustard (*Ardeotis nigriceps*) a game bird much persecuted but tenaciously clinging to its homeland despite indiscriminate hunting. The main biotope of the bird was the grassland in open undulating country in which the Indian Antelope thrived. When the typical habitat was destroyed and the antelope and bustard mercilessly killed, both species came near extinction. The awakening to protect the bird came late by which time the decline of the species had set in and its habitat greatly reduced. Being cursorial, the bird had all the instincts to protect itself from its enemies, despite the fact that it was a large conspicuous bird. Nevertheless, spread of agriculture jeopardised its natural habitat and many hunters took advantage of the lack of wardenship, and it became a target for the riflemen and gunners from jeeps.

My task of saving the species commenced after Independence when I was carrying out rapid surveys of Wildlife in the States of SAURASHTRA: MADHYA BHARAT: RAJASTHAN and PEPSU in 1950, on behalf of the Government of India. At the end of this pioneering work I strongly recommended the protection of the bird and its habitat. The position then was not as bad as it is today.

In Mysore (now Karnataka State), I saw the bird in almost steep hilly biotope confined to an area which only a poacher knew of. Similarly, in Okhamandal and in Madhya Pradesh, poachers seemed to me my best guides to see the bird and take stock of the situation. Although, I tried my best to see that reserves were created, yet without wardenship, a greater danger stood in the way of success, for, hunters would rush to such areas for the 'kill' as it so often happened in the State of Saurashtra. Bustard Posters produded seemed to guide hunters: and yet, the bustard appeared to have survived without any survival service at its back. A wonder of wonders: A factor that favoured the bird was the vegetarian farmer and the peasant who resented trespassing on his land to afford safety to the bird. In desert areas the bird held out owing to its remoteness and in scrub due to its blending colouration which provided concealment.

My problem was how to control or stop the killing of the bird in areas where it was distributed. The World Wildlife (India) came to assist me in this national work in 1970. In this attempt I realised that the bird had no specific abode. It roamed where it found food and cover and yet during the nesting time when cock birds displayed, it sought the same ground year after year and bred where conditions were safe for it. This propensity of recognising safe areas has helped it to survive. Much of this grassland is ideal for concealment. In fact, while resting, accompanied by the Chief Wildlife Warden, Maharashtra State, in hilly terrain when not a bird was in sight and having searched the ground before

us, suddenly a cock bustard stood up from within the folds of the ground next to us and then looked at us unconcernedly and then flew gracefully away to another plateau. How could such a huge bird have escaped our notice was puzzling. I have often scrutinised typical bustard landscape without seeing a bird, and then later, I have picked up some movement, a bustard, and then another and another, as the unsuspecting birds rose and began to forage. Or a little puff of dust seen through my binoculars has revealed to me a bird taking a dust bath in a cart track. Whereas, during the rains on a clear sunlit day one may see the white neck of a cock bird waving like a flag on a rise of land from distance.

In Rajasthan or north Gujarat there is vast grass land mixed with bushes in which all kinds of insects, arthropods, and reptiles and even rodents are found that provide food for the bustard. Some of this country lends itself to jeeps, camels and horses, from which man can easily circumvent the bustard. Look at this terrain closely in the rains and you will see hillocks of sand and shingle protruding from carpets of green grass and millet with a galaxy of bird life feeding on insect life which bustards often help to flush. Such a scene with its tranquil atmosphere far from town or village save for the Rajput hamlets is unique. These Rajput nomads, poor, upright, sustaining themselves on meagre crops which depend upon the vagaries of the monsoon and the camel their lone transport means everything to them, are often the guardians of the vanishing species. When rains fail the area is parched Animal life goes underground for survival or moves to areas close to moisture.

In Madhya Pradesh, I found the bustard more in scrub and in stony hummocks and since much of this savanna is fragmented the bird leaps-frog from one area to another often alighting in crops or flying low over ravines. In this country it is much disturbed by harmful factors.

The nesting areas of the bird frequently converge with its foraging grounds and yet some of them can be set apart. It sometimes happens that the bird finds greater safety in fields as in some parts of Maharashtra, Karnataka and Gujarat where people afford it safety. Strict wardenship over bustard areas has yet to be established and where grazing has to be controlled or made rotational. Private ownership of farmland and grassland in bustard habitat has provided safety for the species and in such areas the bird is confiding. Many farmers do not recognise the bird owing to its sporadic occurrence; others ignore it, but snarers continue to trap it and sell its meat.

Bustards have been kept in Rajasthan and Mysore Zoos for some time, and many have died owing to mishandling. Unfortunately, no Zoo Director in India has known much about breeding bustards and therefore, those kept in captivity have been a waste. Breeding bustard in captivity is a last resort to save the species from extinction. Education of the rural people to protect bustard is the real solution for the safety of the bustard and the bird should enjoy the same immunity as does the Indian Peafowl. A grave danger

that looms large is the harmful effects of use of pesticides and insectides on the bustard. Indiscriminate spraying of harmful chemicals should not be permitted in bustard areas. Governments concerned have to realize the danger of losing an endemic species helpful to agriculture and a pride of the Country. All measures to save it from extinction should be taken. Some States are now thinking in such terms. Let us hope the International Symposium on Bustards ensures such measures.

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THINGS ARE LOOKING UP FOR THE HARD-HIT BUSTARD ..

A Little Success for the Big Bird

BY

GRAHAM PIZZEY

Ten years ago teams were sent to the Northern Territory to capture Australian bustards for a breeding program at the Serendip Research Station, near Lara, (Australia).

The plan was to eventually rehabilitate the great bird in the wild in south-eastern Australia.

Using light aircraft, a marsh buggy and a Toyota equipped with a cannon for shooting nets over the bustards, the teams hunted through a large part of the Gulf country and the Barkly Tableland.

They were often frustrated but finally established 24 birds in a cleverly-designed complex of eight one-acre pens at Serendip.

These pens radiate like segments of an orange, with an observation tower and feeding station in the centre

In each pen a large male bustard is isolated, but the much smaller females can move through the whole area by means of small gates in the fences.

They can shop for the male of their choice, in the pen that suits them best.

The project at Serndip, 250-hectare research station run by the Ministry of Conservation's Fisheries and Wildlife Division, has now borne first fruit.

Why the costly effort? Simply because the bustard is one of our largest and finest birds, a representative of an ancient family of 21 species widespread from here to Africa and southern Europe.

Once a favorite game bird of emperors and kings, the bustard has been made rare or even wiped out in places during the last two centuries.

The Australian species-it's known as the plains turkey-is found here and as a vagrant in southern New Guinea. It has suffered at the hands of both Aboriginal and European man.

One of the first seen by European man had the distinction of being shot and eaten by Captain Cook's party and gave its name to Bustard Bay, north of Rockhampton.

Despite subsequent legal protection, bustards have been shot by hunters and a depressing feature of travel in northern and western parts of Australia, still is the sad heaps of bustard feathers by the roadside,

The bird's foothold in Victoria is tenuous and this is why the former superintendent of game management at Fisheries and Wildlife, Mr. Max Downes, brought the bustards to Serendip.

The hope was, and is, that a continuing supply of locally-bred birds established in suitable local habitats would remain and breed.

Hopefully, improving public sentiment would accord them the moratorium it now applies to the koala, platypus and back swan.

It was no mean project to tackle. Everything about keeping the species in captivity-it's diet, internal parasites, and an unfortunate tendency to develop rickets and to break legs-had to be understood.

Since 1966, this pioneering work has been quietly carried out by Mr. Don White, the manager of Serendip, and a small staff.

They have made systematic observations of the birds' habits and their needs, weighed each of them three to four times a year, and have nurtured the present flock of 15 surviving birds to the point where most of the problems have been worked out.

There was a great moment in the spring of 1973 when the first egg was laid, but the chick was lost. In 1974, two eggs were produced but both were infetrile.

In 1975 four eggs, were laid and two hatched, but because of bad weather and the inexperience of the still-young female birds, one chick died and the other was killed and eaten by a marauding tiger snake when a few hours old.

This year an encouraging crop of seven eggs has been produced. And this time, leaving nothing to chance, the staff has collected the eggs as soon as they were discovered and placed them in an incubator.

So far, three of these eggs have produced chicks: two are still incubating and the remaining two are infertile.

I have been lucky enough to pay several visits to Serendip recently and have watched the growth of these young bustards, the first to be successfully reared in Victoria for over half a century.

Their development has been quite remarkable.

Now aged nearly to months the two oldest are nearly quatergrown. Calm, dignified young birds they walk right up to Mr. White to accept food, showing none of the intractable wildness of their parents.

But bustards do not breed until they're at least five years old, so there will be more years of careful management before these locally bred birds can make their contribution.

Against that, bustards live a long time, and another 10 years careful management could see their numbers increase substantially.

This kind of conservation is an excellent creative, self-sustaining thing for a community. Our bustard is in its environment a lordly, magnificent creature.

Large males stand nearly a metre tall and some weigh over 15 Kilograms. To see a group of them moving in their strange gliding walk, bills held aloofly skywards, is a fine sight.

Males are particularly fine when for a month or more in spring they display on their small bare displaygrounds, or leks, and inflate airsacs in their breasts until the whole white-feathered breast extends to the ground in a dazzling avalanche of white.

Thus enlarged, the bird marks time so that the chest-sac swings to and fro like a large feather boa.

At the climax of this astonishing performance, the bird puffs its throat, so that the feathers frizz out and emits a hollow roar like a distant lion.

To have seen a handful of male bustards, each displaying on his lek scattered across the curving plain, all lit by a blinding late afternoon sun, must have been a splendid thing.

Perhaps, with Serendip's success, we will see it again on our western plains, where the ornithologist Alfred North in the early years of this century once counted 83 bustards within a mile of the Murdeduke station homestead near Winchebea.

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First Successful Captive Breeding of the Great Bustard (*Otis tarda*)

By
Wolfgang Gewalt

In the true sense of the word, captive 'breeding' should be used exclusively for animals that have been conceived as well as bred in captivity. To take a pregnant female or fertilized eggs from the wild and to call the resulting young 'captive-bred' is misleading and a wrong use of the phrase 'captive-bred'. In this context, therefore, it is true to say that the most famous and interesting member of the bustard family, the European great bustard, *Otis tarda*, has never been bred in a zoo.

I have been concerned with the care of European great bustards for more than fourteen years. Most of them were reared from eggs found in the wild near Berlin. In the 1962 breeding season, we obtained three chicks from thirteen eggs laid in West Berlin Zoo bustard enclosure. They were not as strong as they should have been and it was impossible to keep them alive for more than five days. The 1963 breeding season was not much better: five chicks hatched from seventeen eggs also lived for only five days.

In 1964 our flock of great bustards consisted of three males (eight, two and one year old) and eight females (twelve, ten, eight, four, four, one, one and one years old respectively). Cocks mature at five to six years old and hens at three to four years old. Unfotunately at the beginning of the laying season the ten-year-old female was killed by a cock and a second one-year-old female died as the result of digestive trouble. The remaining four mature hens laid eight eggs which, as usual, were put under broody domestic hens. During this period the dominant cock was showing a marvellous display.

Four eggs were fertile. In one egg the embryo died shortly before hatching; the three other eggs produced three live chicks. Their weight at hatching (75-80 gm) was less than that of chicks hatched in the wild (100 gm. or more).

The first hatched chick lived seven days and died, as far as we know, as the result of overloading of the stomach and blockage of the gut, due to its weak condition. The other chicks, hatched on 7th and 8th July did well and were carefully fed as usual with small pieces of meat, grasshoppers, mealworms and cereals, given to them in forceps. Their vitality was low during the first few days and their lives appeared to hang by a thread, but after a time they started to make good progress and this has continued up to the time of writing (July 1964).

Five weeks after hatching, the larger of the two zoo-bred great bustards weighed 1,700 gm.

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Why Great Indian Bustard ?

By

Harsh Vardhan

General Secretary, Tourism and Wildlife Society of India

Why Bustards only ? Many try to shatter the confidence by putting such questions. And my simple answer is "Why not Bustards as well." But there was a point why it became the pursuit for the Society.

It was the quarter centenary of the famous Haldi Ghati battle near Udaipur and Mrs. Indira Gandhi as the Prime Minister was at the dias. I was on an assignment to cover that momentous event about an epoch-making incident. I went up the dias to present her a copy of an article on her visit to the Bharatpur Bird. Sanctuary some months ago. She smiled. She thanked. I was elated. But the next moment she suddenly put a question:

"What is happening to the Great Indian Bustard in your State ?"

I was shocked. I had never even dreamt of such a question having been put by her. The answer led her to ask more. A discussion followed.

However, astonishing that dialogue was, for me, nay some of us, the die was cast. Much before this incident, I heard of the Great Indian Bustard when the Queen of England had visited India. It was reported that she was served this bird. To this date, the authorities could not confirm it. To my bad or good luck, I had not attended the dinner. Next, the GIB made news in 1969 when the IUCN General Assembly met in New Delhi and Dr. Salim Ali helped the species by raising its despicable plight. Next came the first-ever broad and extensive survey undertaken by Mr. Dharmakumarsinhji.

The association of our group with GIB, however, became. extemely intense when the members of the Society were called for running a massive campaign to oppose the wanton killing of the wildlife by a foreign VIP in Rajasthan desert in the winter of 1978-79. I had the credit of organising a silent protest march through the streets of Jaipur to hand over the strong Note of Protest to the Government on behalf of the citizens of Jaipur. Besides the Tourism and Wildlife Society of India. another most noted social organisation, Tarun Samaj, had joined hands together in mobilising the public support against that "desert safari". It succeeded. The wild hunters had to pack off much to the satisfaction of the millions of people of the country who had taken a cue from us.

I had the first chance of spotting the GIB, in Rajasthan towards the beginning of the seventies. It was a location near Pokaran, nearer to the nuclear blast, where I went to see

out of curiosity in course of one of my assignments for covering the desert region. The bird was, perhaps, a male, standing solitary near a bush about 500 metre away from our jeep. I vividly remember the quarrel with my driver who was calling it "*Godawan*" while I tried to ignore him by saying, "No it is Great Indian Bustard". It was much later that I knew that "*Godawan*" was the local name for GIB in that region.

In June, 1980, I toured four States in order to establish the truth, or demolish the belief, that GIBs survived in some locations. As no authority was prepared to state the factual position, seeing was believing. The tour provided some genuine information, which I call as facts, summarised here:

Karnataka, Maharashtra, Madhya Pradesh, Gujarat and Rajasthan have GIB population. All the five States have now started taking effective steps in identifying the habitats and declaring them as closed areas. However, that is not the end. Much remains to be done, which the International Symposium on Bustards should decide.

The Ranebennur Sanctuary in Karnataka is along the Bangalore-Bombay highway. It is good that the board on the road describes it as a Blackbuck sanctuary. And what is worse is that both the Blackbuck and GIB have been compelled to get out of this one-time scrub land surrounded on three sides by black cotton soil and on one side by a hillock-line formation. The extensive plantations of eucalyptus have whipped the wildlife adversely. I was astonished to spot three Great Indian Bustards in two days there. I was greatly shocked to read later the expert report of Mr. M. Krishnan whose suggestions were undermined and the wrong flora was continued there.

GIBs are thriving in Solapur-Ahmedangar belt in Maharashtra where I trekked long distance to see the decimation of flora by repeated droughts and excessive over-grazing. The happy trend was that pastures were being developed. GIB has staged a come back where ever the pastures were established. Not only GIB, the Blackbuck has also reappeared. The officer posted there to undertake the Drought Prone Areas Programme (DPAP) had training at the Central Arid Zone Research Institute, Jodhpur. Therefore, I have reasons to underline the importance of pasture as well as the right type of flora for the survival or reintroduction of fauna, as has been fervently advocated by CAZRI for past 25 years. The forest authorities in other States can derive a lesson from the example of Maharashtra.

Gujarat was perhaps, the richest State for GIBs. Today, the birds have the largest number of supporters in that State. But its own numbers are reduced there. The areas leading to Dwarika have reported GIB surviving. But it is a terrible pathos for the bird and foresters to restore the habitat. Yet I am optimistic because the people of those areas have a heart to do things suggested. They are largely vegetarian too.

Madhya Pradesh responded very quickly to my pleas. Within five months came the news that GIBs were sighted around Gwalior in the Shivpuri belt. Also they were reported breeding.

The Desert National Park is taking shape in Rajasthan. The country has high hopes from its management. GIBs should be present in the Park zone though I could not see them there. The best locations for GIBs in that very district of Jaisalmer, however, are around Ramdeora, Bap, Phalodi and other "*oran*" isolated and off the beat as they all are. Areas adjoining Nasirabad, Bhilwara and Kota have also reported presence of GIB's. I thought the credit should go to those who spotted them, like Mr. R.S. Rathore of DFO office in Ajmer. But came a bunch of papers from Mr. D.S. Chavda, Executive Member of Bombay Natural History Society, while I was typing out this feature. He sent photostat copies of the BNHS journals which had published all about Bustards in India. It would come as a surprise to many that as far back as in 1943, Mr. Dharmakumarsinhji had spotted GIBs in all above areas. Also he had written about breeding, behaviour and mating of this species in BNHS journal in 1943 itself.

Do we not have reasons to accredit the voluntary people ? Let the ISOB decide all such aspects.

Arabian Bustard Expedition, April 1977

By
Ben King
Ornithology Department, American Museum of Natural History, Central Park West at 79th Street, New York-10024

The purpose of the 10-days trip in April 1977 was to see the Arabian Bustard, Ardeotis arabs, still existed in Saudi Arabia. John Gasperetti organised and led the expedition. Dr. Iyad Nader of the University of Riyadh, College of Education at Abha, joined us at Abha.

Arbian Bustard—a pair was seen well at a distance of about 80 metres several times a few km west of Jabal Lababa on 26 April. The last record in Saudi Arabia was in Wadi Hali (1972, Popov, G., M. Paskin, and A. Harvey, J. Saudi Arabian Natur. Hist. Soc. 3: 17-23). It is likely a scarce resident rather than vagrant as listed by Courtenay-Thompson (1972). The picture in Heinzel *et al.* (1972) is good on colour, but the bird has a conspicuous white eyebrow and eyering and is made to look too stocky and far too thick-necked. It is massive in flight, rather like a large crane. The local Bedu were familiar with the bird and directed us to the area in which we found them. While we could not determine how many bustards are there, it is certain that the number is not large. Therefore, it is important that an extensive survey of the area be taken soon to determine the numbers of birds present and the size of a protected area necessary to insure their continued existence. There is an asphalt road within a few km of the place we saw the bustards so that unless this magnificent bird is stringently protected, it will likely disappear from Saudi Arabia forever.

(Reprinted from the Journal of The Saudi Arabian Natural History Society Number 21, January 1978, Jiddha, Saudi Arabia).

Her Name are Many

The world so well knows the scientific name of the Great Indian Bustard as *Choriotis nigriceps*. However, the bird has been nick-named differently regions of India. It finds its occasional references in the folk lore and folk literature of Rajasthan at least. I believe other States' people would also have eulogised the bird likewise. However I am at loss to find its mention in the ancient scripts. Only Mr. M. Krishnan describes the GIB having been depicted in a "Hampi throne."

In Rajasthan, the GIB is largely and popularly called as "*Godawan*". No one can explain what is means or why this name was ascribed to it. In Ajmer region, where I saw maximum number of GIBs, the farmers called it "*Goonjana*"—the name which echoes. Rightly named, indeed, for the bird gives a very loud call like that of a roar of a lion from a distance.

Mr. Dharmakumarsinhji's books describe the GIB as "*Ghorad*, "*Kharchal*" or "*Tugdar*" Again, there do not appear to be any significance to the names. In Gujrat, it is called "*Ghorad*".

In Maharasthtra, I found that name standing true to its natural habits. The GIB is called as "*Maldhok*", the bird which lives on plain land.

In Karnataka, the people called it "*Yerladdu*" or *Yerbhoot*". *Yerladdu* has no meaning. *Yerbhoot* does have the bird which sounds like a ghost, which is true about it. The Lambani tribals were stirred in villages when the GIB's full throated call was heard by them for they thought they were haunted.

Despite having so many names, the Great Indian Bustard is largely the most unknown bird. People living very close to the areas where it is found do not know its name. They cannot identify it. They are ignorant about it. That may be the only reason for its survival however scanty in numbers it may be. Otherwise, the cruel hands of man have done everything for extinction.— H.V.

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How Many Bustards ?

In my 30-day tour of 4 States in India, I could see only 13 Great Indian Bustards, three in Ranebennur (Karnataka) and ten near Nasirabad (Rajasthan). The question is how many GIBs are present in the country today ?

The fact is that GIB is on its last leg. The Government was aware of it in 1952 when the Indian Board of Wildlife included it among the 13 rare fauna to be protected.

According to the World Pheasant Association' there are not more than 180 GIBs in Rajasthan at present. Their number in the whole of the country was 1,260, in 1969 which plummeted to 745 in 1978. In 1969, the GIB was included in the Red Data Book of IUCN. The same year, the IUCN conference highlighted GIB's plight. However, it was only in 1972 that the bird was provided a legal cover through the Wildlife (Protection) Act, 1972.

Similar is the case with the captive breeding of GIBs. I have been observing them in Jodhpur and Bikaner zoos for over six years. They lived like the jail birds with no attempt to make them breed incaptivity. I am told the GIBs were kept in Mysore and Trivandrum zoos also. We only decimated their numbers in zoos.

Dr. Max Downes, Wildlife Consultant for Australian Government, deserves compliments of the world's experts for having bred successfully the Australian Bustards in captivity and also assisted technically in establishment of a Breeding Farm for the species at Serendip in Victoria, which is doing fine.

Besides this writer, several forest officers had a chance to hold discussions with Dr. Max Downes who visited Jaipur as a prelude to the ISOB. He is attending the Symposium Is it not possible for the Union Government to constitute a working group on Great Indian Bustard's captive breeding in India with the technical expertise of Dr. Max Downes and active guidance of Mr. Dharmakumarsinhji, the two giants in this field. The working group should visit the five GIB States, incorporate their officers and establish a research station in any of them under the direct guidance of the Central authorities. It may be called The Bustard Project.—H.V.

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Bane of Conservation—The Pretentious Preacher

By

S.R. Chaudhury

No crocodile tears even, for that beheaded lamb, stripped of its pelt, the 'Salam Bakra' kneeling on all fours on the richly decorated lunch table, a speciality of Hyderabad, hosted by the Vice Chancellor of the Agricultural University, Andhra Pradesh.

How every nonveg including the pretentious preacher lined up for a tender piece from its neck, shoulder, rump and hock, and lastly from anywhere, any piece sticking to the new bared skeleton.

What resigned look in his tender eyes and what soft supplication in his pleading bleats when the sharpened knife had been placed across his throat? Was he not as beautiful and lovable as any in wildlife?

The tree too, voiceless and eyeless though, does react to even the thinking near it by anyone intending to cut it. A shiver runs down, we are told, its whole frame in its agony expaessed to such thought.

Would I dream about these, conscienc striken? would I then be living, if I did?

Life has sustained life, *Home erectus* through *Home sapiens*, millenia before them and many many ahead. That is our ontogeny, at the helm of life in this planet, the omnivore human. Why then was this hypocrasy (1) : taking a double helping of the Salam Bakra' and then back in the hall preaching to the delegates of the International workshop that there should be no consumption of venison; no cropping of any surplus in the wild; no role of wildlife in providing animal protein to the people.

Admitted, some of us have chosen not to partake animal protein. But, majority among the others who need and want it are starved, while in this country the productivity in animal resources may be going waste somewhere in nature, because of our inability to manipulate the ecosystem which, honestly, we do not knowhow to. May I cite examples.

One such had been objectively assessed in the measurement by my students, 1970 through 1973--17,000 cheetals (*Axis axis*) in 200 sq km in the Chilla-khara forest opposite Hardwar.

The annual increment in that population assessed in 'life equation' studies, was nearly 50%, in stable yearlings. We did not interfere. The jackals did in their ammenssalistic interaction in nipping the growing end of that population in pregnant females and

tender fawns they killed. Should they have been allowed to so dessimate the cheetals in their unwise ways of a new predator's acquired behaviour ? Should it not rather, in the true conservation ways, that the excess growth had been taken for the balanced well being of the ecosystem and the benefit to man ?

A parallel case record of Sariska sanctuary in Rajasthan reveals the death of more than 1500 sambers alone in 1971. Hesitation in releiving the over too dense population was the reason. A rather minor pathogen of *Haemorrhagic septicemia* could sweep through the closer packed population easily in epidemic proportion.

Sadly we did not have the knowhhow to know that such were the ways of nature in engaging Jackal, or H.S. pathogen to strike for the balance. And so thus, preservation indeed ? Who was it that lost in such peevish bargain with nature: ?

Again it is because of such lack of ecological ini ght that we contnue to feed and fatten the migratory fowls only to give the benefit of our land to the people of the land of origin of these water fowls, by foregoing our rightful share in the preservation cult of the pretentious conservationist, ecologically unwise, more than the jackal.

Should we not be on our own : start learning to identify ecological problems and evolve ecological remedies with a view to realise increasing ecological benefit. It means education, and education at all levels.

Authentic education rests entirely on reliable feedback system geared to stimulate basic perception, formulate rational conception and appropriate confident prediction. The crying need, therefore, of this country is : multidimentional institutes in different life zones to cover wider ranges in advanced studies and research in wildlife conservation.

For, what is precious is not apparent in our natural ecosystems. Not so much their tranquil greens, nor is it their gayous colours. It is the productive life in them that pulsates in magnitudes far beyod the ken of imagination. That life should be conserved in proper shape for the lasting well being of human being in the rationales of World Conservation Strategy lasting launched by the Prime Minister of India on March 6, 1980.

Better start moving. Else pretentious dreams with crocodiles appearing in tears pleading to stop their farming may continue to be recounted to the disgust of conscentitous conservationists.

That sham preacher did get a thunderous round of claps from his country delegates, all said to be scientists; I wondered, and wondered too, what the others thought, after having seen that excellent Chinesh movie on conservation management and harvesting of wildlife ?

Game Farming and Harvesting of Wildlife Products through Village Panchayats and Tribal Cooperatives

By

M.A. Rashid

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A. Introduction

1. In its wealth and variety, India's wild life compares favourably with that of any other country of the world. What we lack in sheer numbers is made up by the rich diversity of our wild fauna which is comprised of 500 species of mammals, 2100 species of birds. 250 species of reptiles, and 30,000 species of insects. Among the more important species of mammals may be mentioned the Asiatic lion, tiger, panther, Indian wild ass, one-horned rhinoceros, elephant, bison, wild buffalow the various species of deer, antelope and gazelle, wild boar, different varieties of bear, etc. The avifauna includes the Great Indian bustard, peafowl, jungle and spur fowl. partridges, quails, sandgrouse, flamingo, and water birds, birds of prey, etc.

2. Prior to the advent of Independence, wildlife was relatively abundant in most areas of the country. particularly in the erstwhile princely States where hunting by the general public was strictly farbidden. But with the abolition of the princely order and the thoughtless destruction of wildlife through commercialised poaching and the widespread sacrifice of forests for agriculture and development projects which followed in the wake of Independence, the frontiers of wildlife receded into the more hilly and inaccessible areas and most species were mercilessly persecuted to the verge of extinction.

3. It was only around the beginning of the seventies decade that the gravity of the situation was appreciated by those in authority and concerted measures were taken to conserve the remanants of our wildlife. Since then, there has been a significant increase in the number of wildlife sanctuaries and national parks all over the country which now number 164 (1,33,464 sq. km including 10 bird sanctuaries) and 15 (6797 sq. km) respectively. Special elaborate projects for the preservation of the lion and tiger were launched during 1972/73 with central/foreign assistance.

B. Need for game famming and harvesting of wildlife products

4. In the present day context, wildlife has been severely depleted in areas outside the sanctuaries and national parks and whatever little remains is also steadily disappearing. Even in the case of sanctuaries, their are quite a few which can hardly be said to abound in wildlife and are therefore urgently in need of re-stocking to make them purposeful and effective. The only obvious solution to this problem is to take up game farming on a large scale all over the country. Although this is perimarily the function of

the Forest Department or specifically of the Wildlife Organisations wherever these exist, the problem is of too vast a magnitude to be tackled effectively single-handed by this agency which is invariably subjected to constraints of both funds and staff. The time has therefore come to give serious thought to ensuring the increasing involvement of private agencies such as Village Panchayats and Tribal Cooperatives in this venture. Incidentally, these backward and downtrodden sections of our rural pobulatian also haapen to be the main agencies which have been responsible for the indiscriminate destruction of our wildlife through prolonged misuse of their so-called crop protection guns for the purpose of commercialised poaching, particularly over water holes during the hot summer months, not only for supplementing their frugal diet, but also for earning a livelihood from the sale of wild life products illegally acquired by them. It must, however, be admitted that these sections of our population are condemned to live below the poverty line and suffer from chronic malnutrition. They are, therefore, compelled by force of circumstances to strip the land of trees and shrubs for fuel and firewood, clear steep and unstable slopes for cultivation, over-graze pastures and over-hunt and over-fish the local wildlife Thus, in their day to day struggle for survival, they disrupt their own life-support system impair ecological processes and destroy genetic and other renewable resources. However, and talk of wildlife conservation based on purely ecological and idealistic considerations would be meaningless to them unless they are offered adequate inducement to cooperate and collaborate with the authorities in wildlife conservation programmes. Actively involving them in a programme of game farming by creating the necessary intrastructure, making available the necessary technical know-how, and providing them with easy credit facilities and marketing services adaptable to their needs should therefore lend itself as a possible method of weaning them away from their present destructive practices and involving them in a creative activity which will not only improve their socio-economic condition, but also help to restore the ecological balance which has been so seriously disturbed hitherto as a result of their activities.

5. Incidentally, some of the developed countries like U.S.A. have taken to game ranching in a big way through private enterprise. In Texas particularly, a number of Indian species of wild ungulates such as blackbuck, chital, sambar etc. have been successfully bred in large numbers. Further, it is now an established fact that wild ungulates are easier and more economical to raise than domestic livestock as they are less selective in their fodder requirements, make a better use of the available fodder supply, and are capable of yielding a comparatively higher biomass per unit area of the ranch. If all these advantages are properly publicised, there is no reason why game ranching should not prove popular in this country also.

6. Generally speaking, no systematic method of exploitation is adopted here at present in respect of the available wildlife products, such as skins, bones, horns, antlers, feathers, medicinal products, etc. These are either wasted or disposed of in a clandestine manner through the agency of unscrupulous petty traders. The exploitation of such products should also be properly organised and developed by entrusting it to tribal cooperatives operating under the supervision and guidance of the Forest Department or their Wildlife Organisations.

C. **Species proposed to be bred and propagated;**

7. To begin with, the following species of wild life could be taken up for game farming:-

Mammals:

Game amimals—such as all deer species, blackbuck, four-horned antelope, chinkara, wild boar, hare, etc.

Birds:

Game birds—such as jungle fowl, spur fowl, partridges, quails, bustards, etc.
Other birds—such as song birds, mimics, birds of plumage, etc.

Reptiles and amphibians:

Crocodiles, snakes, lizards, turtles and tortoises.

Fishes etc.

I.) **Inland sweet water fisheries:-**
Mahseer, murrel, rohu, trout, lobsters, etc.

II.) **Coastal sea water fisheries-:**
Edible fishes, prawns, edible and pearl oysters, etc.

D. **Infrastructure and equipment required:-**

8. To begin with, it will be necessary to identify and earmarks suitable areas in each region where game breeding farms can be established. Initially, such farms should be started in the vicinity of our better stocked sanctuaries and national parks from which surplus animals can be given out to the game farms for breeding purposes. Lands required for these farms should be forthcoming either from the community lands belonging to the Village Panchayats, such as gauchars which are at present being mostly used as mere exercise grounds for the cattle, or from revenue waste lands, or from degraded forest areas, ravine lands or pastures belonging to the Forest Department. In the case of Government lands, nominal rent may be recovered from the Panchayats or cooperatives. The

size of the plot earmarked for this purpose would depend upon the species to be raised and the extent of areas available. On an average, an area of around 10 ha. should suffice. The next step would be to fence this area, preferably with locally available materials such as brush-wood rubble stones, etc, for which the villagers should provide voluntary labour. Adequate arrangements would have to be made for looking after, feeding and watering the animals. The services of a Veterinary Officer would also be necessary to look after the health of the animals within his region or district. Adequate arrangements would also be necessary for trapping the animals from the sanctuary and translocating them to the game farms. Provision of tranquilliser equipment for this purpose would ensure that the trapping is done with a minimum of mortality. Departmental vehicles could be used for transporting the animals in special crates. For rearing game birds, arrangements would have to be made with the help of the villagers or tribals to collect adult birds or their eggs from the forest and kerosene-operated incubators provided for hatching the eggs. For breeding of reptiles and fish, ponds and hatcheries with adequate water supply would have to be provided. In the case of harvesting of wild life products, adequate storage facilities would be necessary.

9. As regards the disposal of the animals raised in the game farms, some workable arrangements would have to be arrived at between the Forest Department and the beneficiaries of the scheme. The Department could probably take over 50% of the animals for re-stocking its depleted areas and by way of compensation for the expenditure incurred by it. The remaining animals could be allowed to be marketed by the Panchyats or cooperatives to their best financial advantage through the agency of the Department. If the beneficiaries happen to be meat or fish eaters, a part of the production from their game farms could also be set aside for providing them with protein diet.

10. To begin with, the Panchayats or cooperatives participating in this project would require finances which could be made available to them either by the Forest Department by way of takavi loans or through loans offered by cooperatives or rural develoment banks on a nominal rate of interest and easy terms of repayment. Thus the various agencies involved in the implementation of such a project would be the Forest Department or Wildlife Organisation, the Fisheries Department, Revenue Department, the Tribal Welfare Department and the Animal Husbandry Department. As far as harvesting of wild life products is concerned, this work could be entrusted to tribal cooperatives aided by the Forest and Cooperative Departments and by the Forest Development Corporations wherever these exist.

E, Propaganda and publicity:-

11. One of the major obstacles in the way of the wildlife conservation movement in this country has been the total apathy—if not antipathy—towards wildlife, particularly

among the agrarian rural population. It is an unfortunate fact that the average Indian farmer, plagued by illiteracy and blinded by prejudice, looks upon wildlife as his greatest enemy which he would profer to destroy at the first opportunity. Little does he realise the valuable role that wildlife in general has to play in protecting his crops against pests and in maintaining the delicate ecological balance sovital for his own existence. Under these circumstances, the launching of a country-wide programme to encourage game farming would necessarily have to be preceded by a vigorous propaganda and publicity campaign in rural areas to make the villagers and tribals appreciate the utility and importance of wild life in nature's scheme of things and adopt the methods of harnessing this gift of nature to human advantage without endangering or degrading the environment. State Governments should therefore give serious thought to the creation of special publicity units to adequately cover all the rural and interior forest areas so as to spread the message of wildlife conservation and thereby create a congenial climate which will help to bring about a radical change in the present hostile attitude of villagers and tribals towards wildlife.

Kokkre Bellur Pelicanry

By,
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Conservator of Forests, Jaipur.

Thanks to Mr. E. Hanumanth Rao of Bangalore who advised me to visit the Kokkre Bellur Pelicanry, during my inspection tour of bird sanctuaries in Karnataka in April, 1980.

The breeding grey pelican in association with painted storks offered a fascinating spectacle which hardly any other pelicanry in India can provide. The rural setting and the confidence of breeding birds, established by strict protection by villagers for centuries, endow this breeding colony with a special charm. One can enjoy rhythmical wing beats of pelicans and vivid colours of painted storks only 5 metres over his head.

Location:

Just a kilometre short of Madur, famous for Falcon Scooters, is a village Somanahailli, 75 kms away from Bangalore on the main Bangalore-Mysore Highway. Branching off to the left from this village, along a partly bitumen topped and partly metalled road for about 12 kms through typical Karnatak villages you reach the village Kokkre Bellur in Channapattana taluk (of Bangalore District.) which has a pleasant surprise in store for you.

Trees—the maternity centres.

The trees of jali (*Acacia nilotica*),*Delonix elata*, *Ficus religiosa* (peepal)*Ficus benghalensis* (banyan) and Tamarindus are standing in their private fields. There are many trees scattered apart or growing in clusters but only 32 trees were selected for nesting by spotted billed or grey pelicans in company with painted storks and some only by painted storks. There is no Govrnment. or forest land. There is no pond, tank, channel, or river in which the boles of trees could remain submerged atleast during the breeding period of birds. The fields were bone dry at this time of the year. In the season only ragi and jowar is grown in the fields, The trees preferred for nesting by these two species were jali, peepal, banyan and *Tamarindus indica* only. The heaviest congregation of breeders was on banyan trees. There were also some raptors the brahminy kite *Haliastur indus* locally termed as garud—a really handsome predator with bright chestnut above contrasted with white head, neck and breast perching on peepal trees. They were reported to be nesting here but we could not see any nests.

Breeding since antiquity:.

Local enquiries from Shri Nagraj, game watcher through Shri Prasanna, Liasion Officer revealed that these birds have been breeding here from times immemorial. This village has nursed broods of hundreds of generations of grey pelicans and painted storks, even the oldest person of Kokkre Bellur testified that his grand father also witnessed similar breeding activity. Some of the banyan trees are century old. It is really intriguing to observe that for the past many years only these very thirty two trees are choosen for nesting. This year about 200 pelicans and 2,000 painted storks were now busy bringing up their young ones.

Arrival and departure of birds

The pelicans (*Pelecanus philippensis)* start coming here by November and they occupy the upper most stratum of tree canopy. The courtship is followed by nest building soon after, the nest being a large stick platform with some depression in the centre. The egg laying commences generally in January/February and the chicks in April had developed white down. The pelicans bid good-bye by June to this breeding centre, of course, with a promise to come back again.

The painted storks (*Ibis leucuephalus*) arrive a little later in December/January. The breeding pairs start preparing their platform like nests of twigs on the top of the trees and also on lower branches. There is a small concavity in the nests which is lined with leaves of local trees. The nests often touch others of their own brethren and some times of the pelicans. There is, however, prefect coexistence between the two species sharing the same tree crown. The breeding painted stork couples soon get busy incubating eggs laid

in February/March. Most of the chicks were now about 2 months old. They were snow white with black bill as compared with their colourful parents with yellow bills and red legs The painted storks leave the heronry on the onset of monsoon in early June

Unique breeding season

The painted storks all over India commence their breeding enterprise with the commencement of monsoon. In Bharatpur and Nawagaon National park (Bhandara district Maharasthra) breeding coincides with S.W. monsoon (i.e. July/October) which dominates in N. India. It is not understood why these painted storks have found dry season of February to June suitable for raising their progeny in Kokkre Bellur. The nearest water hole is the Shimsa river about 15 kms away from the breeding colony. Here also during day hours, painted storks were not observed by me (duriug April, 80) feeding in the river waters. They must be flying far off in quest of fish, their staple food.

For pelicans, it is not unusual for their breeding colony is often far off from waters. In Aredu sanctuary (West Godavari District, Andhra Pradesh) the largest pelicanry India has, Kolleru lake, as their main feeding ground is easily 15 kms as the pelicans fly. Their breeding period is also not differnt from other pelicanries in India.

It is only an intelligent guess to suggest that during breeding period when fish requirements of the painted storks are high, there is the ease with which fish are caught in dry season or in early rains. Birds are known for instinct and we do not know if the generation after generations of these painted storks are breeding here only instinctively.

Other heronries which come alive during dry season are for night heron in Bangalore, for little cormorant and grey heron at Mattikere on Bangalore- Mysore Road. These are also principally fish consumers.

Symbiotic Association with Man:-

The birds are seriously vulnerable during their strenuous breeding period and realizing this the villagers have been protecting them for ages. It is certainly an important adaptation that all these heronries of dry season are located on trees near human settlement. These birds obviously have the distinct advantage of paucity of predators near human habitation as well as of their good will. It is true for the pelicanry in Kaziranga village in Assam as well.

This age old cooperative relationship of feathered bipeds and bipeds is not demanding on one partner only. While these feathered friends, the painted storks and pelicans get shelter and security, through the people, during their delicate and hazarduous maternity period, they reciprocate the obligation by fertilising the soil underneath the nests, through

their phosphate rich dropings and left-over fish. Many many years ago the stale and stinking fish, considered useless by the poor farmer, was buried in a corn field. Bumper yield was had from these plants. This ultimately developed the concept of artifical manuring of our crops. The villagers in Kokkre Bellur spread cart loads of red earth under these trees which is almost painted white through dropping by the time the birds leave the trees and in addition the fish which is thrown out in confusion by untrained chicks during their feeding by parents make their ordinary earth a real silver earth which potentially is represents in the form of enhanced and improved crop production.

Suggestions:-

Wildlife still yields us pleasure for leisure hours. It shaped even our culture. Like winds and sunsets wildlife was taken for granted until the so called progress disturbed the harmony between nature and man. Let us, however, not forget that we will be judged by our offspring and in that judgement if all they can contemplate is muddy and polluted rivers, eroded hill sides, denuded forests and wildlife behind glass, stuffed, then they will have a right to ponder just what type of improvident barbarians sired them. Kokkre Bellure is a natures trove and has been providing us much and can provide us more if we manage is more effeciently. As a show palce for the visitors and tourists especially for bird watchers, it is indeed a matter of observation and experince, and not expression. It is an ocean of learning for biologists, naturalists, environmentalists, conservationists and for photographers it is a paradise of riot in colour. Its easy accessibility from tourist attraction like Bangalore/Mysore can profitably bring it on regular itinerary of the home as well as foreign tourists during the breeding season of these birds.

Kokkre Bellur is an example of the people's concern for the safety of their beneficiaries the birds. Any attempt to encroach upon the traditional approach is fraught with the risk of their initial opposition. Perpetuation of village conventions is still a prestigeous and glorious cause for the inhabitants. The development although desirable, has to be cautious and extension oriented. To start with a legal status may be provided to the breeding colony by declaring it as a closed area under section 38 of the Wildlife (Protection) Act, 72. Basic data on population dynamics, feeding grounds of birds may be studied. Photography with tacit understanding and consent of the villagers be permitted in such a mannner that birds are not perturbed when feeding chicks specially in early mornings. A literate local villager may be appointed as a watchman to deal with vandals who violate the provisions of the Act.

It will be an ill-advised action to acquire the land by the Govrnment. for people, who are for ages deeply involved in the well being of these birds might lose interest and develop usual apathy for government activities. Such delicate and sensitive situations in which even

temporary disturbance may force the birds to disown their breeding home, can not be off set by all modern machines or wokshops or the technical know how at our command. The approach road to this village could be improved. Small tanks of about 20 x 50 metres with a sloping bottom varying in depth from 0.25 metres to 1.0 metre can be constructed to allow fishing by pelicans in deeper waters and painted storks in shallow waters. A small rivulet of nearby shimsa river could also be dammed to provide fish to pelicans and painted storks- A watch tower merging with surrounding (with outer surfaces rough and dull coloured) which can also serve as a rest room could be initially constructed by the side of the tall tree of peepal and the telesope be fitted in it.

* * * *

Abstract

An exemplary example of villagers compassion for birds and their desire and determination to provide them shelter and protection is exhibited by inhabitants of Kokkre Bellur situated in rural setting between Bangalore and Mysore in Karnataka State.

Trees of jali (babool), pipal, banyan and tamarind growing in private fields of the clutivators serve as maternity centres for grey pelicans and painted storks. The pelicans and painted storks arrive here in late winter and breed through dry season of summer. It is probably the only breeding colony of painted stroks in India which is alive during this period and that, too, on trees which are not at all surrounded by flowing or stationary water at any time of the year. Why ! is a question of study.

The pelicanry is an evidence of the symbiotic association of bipeds and winged-bipeds. Considerate and kind, people of Kokkre-Bellur have been providing security to these breeding birds during their hazardous maternity period for generations and the feathered friends reciprocate by fertilizing their fields.

The pelicanry, although unique, is practically unknown. This nature's gift sustained by rural folk, without any official assistance, has a great potential for the enjoyment, education and emulation of the urbanites-

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African Ivory Trade in India

BY

K. PRASAD, I.F.S.

1. Introduction

1.1 The demand for ivory is as old as man himself. It is an exceptionally hard substance, but despite being difficult to cut and work, it is highly valued for ornamentation. It is an ideal medium for carving and has for centuries been used for this purpose, principally in the East and in parts of West Africa. Because of its superior size and quality, African ivory (*Loxodonta africana*) is preferred to Asiatic (*Elephas maximus*). Long before the interior of Africa first became known to the World, ivory had been one of Africa's two main exports, the other being slaves. These two items—black slaves and white ivory—were for centuries the principal items of African commerce: there was little else which the local people could barter for cloth, beads and other manufactured goods for which they hankered. Much of the ivory went to Arabia and India; some went as far as China. It was highly lucrative business. During his exploration of the Southern Sudan, Sir Samuel Baker estimated that ivory yielded a minimum profit of 1500%. Abolition of slave trade in these territories coincided with the lifting of the royal monopoly on ivory trading. Ironically this opened the way to a concerted slaughter of elephants, for one of the immediate practical results of stamping out slavery was to leave ivory as Africa's only commercially valuable commodity.

2. India's Import

2.1 With the increase in international trade in African ivory India has been importing for the past several years sizeable quantity from many African countries to sustain her large ivory trade. It is difficult to say the quantity of African ivory imported as perhaps there was not much restriction on such import before February 4, 1977, the day this species was included in Appendix II of Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Generally ivory is used by village women in the States of Rajasthan and Gujarat. A rough estimate was carried out in 1978 and such stock was found to be around 36700 Kg. Based on export permit, bill of entry submitted by the importers 5012 Kg of African ivory was imported during 1979 from Kenya, Sudan, Tanzania, Tchad and Uganda. (Where country of origin is not known, it has been shows as African.) A break up of such import is given in Table I.

Table—I

Country of Export	Country of Origin	Quantity in Kg
Federal Republic of Germany	Kenya	710
Hongkong	African	070
	Sudan	327
	Tanzania	319
	Tchad	500
Kenya	Kenya	1349
Sudan	Sudan	132
Tanzania	Tanzania	605
Uganda	Uganda	577
United Kingdom	African	423
		5012

3. **India's Export**

3.1 India has for very long occupied an important position in international trade in ivory articles. Artistic excellence of intricate ivory carvings is well known and is valued all over the World. India became member of CITES since October 18, 1976 and on February 4, 1977 African elephant (*Loxodonta africana*) was included in its Appendix II attracting provisions of Articles IV and VII. In order to assess the quantity of African ivory available in India for export and said to have been imported before February 4, 1977, a Public Notice was issued by the Ministry of Commerce requesting the manufacturers/dealers to declare the stock held by them on February 19, 1980. From the records received from All India Handicrafts Board till June 13, 1980 it appears only 10255 Kg. was declared. As against these imports 12950 Kg. was exported during 1979 in the shape of chess sets, ornaments, statues, Pill boxes, Powder boxes etc. valued Rs. 215.19 Lakhs. Table II gives the details of India's contribution in International Trade and expected number of African elephants involved in it. The last column is based on figures of mean tusk weight of 6.9 Kg as found from the records in the Wildlife Regional Offiee, New Delhi.

Table II (1979)

Name of Importing Country	FOB Value (Rs. in Lakh)	Weight of African Ivory (Kg.)	Expected No. of African Elephants involved
Belgium	6.06	470	34
Canada	2.87	115	8
Czechoslovakia	1.05	36	3
Denmark	16.26	721	52
France	38.65	2310	167
Federal Republic of Germany	57.36	3190	231
Hong Kong	3.43	212	15
Italy	33.75	1677	121
Japan	1.81	64	5
Netherlands	12.59	564	45
Singapore	2.14	273	20
Spain	5.81	380	25
Switzerland	4.71	121	4
United Kingdom	4.67	323	21
U.S.A.	15.88	778	56
U.S.S.R.	3.69	63	5
Others	4.46	1653	120
	215.19	12950	932

3.2 Mean tusk weight has however been found to vary according to statistics of other countries. One of the largest pools of accessible data in Africa is DAR-ES-SALAM Ivory Room of the Tanzania Game Division. Devitz in 1977 calculated that during 1971-77 43877 tusks entered the Ivory Room with mean weight 4.81 Kg. Iain Parker found mean weight as 7.8 Kg in Hong Kong. Royal African Company Court of Sales handled 162300 tusks with mean weight as 11.9 Kg.

4. Position of Indian Craftsmen in the System

4.1 Trade is controlled by exporters who pay pittance to the craftsmen. There are comparatively few exporters and all of them are well known. Ivory carving is a family business and are located in Varanasi, Lucknow, Delhi, Jaipur. Mysore and Trivandrum, Personal interview with some of these carvers reveal that even after decades in this trade their working conditions have not improved much. These craftsmen are not considered as part of the trade to circumvent application of Labour Laws, Minimum Wages Act and Provident Fund benefits.

5. Effect of Trade on Survival Status

5.1 Dr. Iain Douglas Hamilton in his "African Elephant Ivory Trade Study" report 1976-79 has estimated African elephant population as 13,43,340. The elephant survey covers 35 African countries; in 28 of them the elephant populations are declining. Shrinkage of habitat, massive poaching in line with rocketing ivory prices are deadly to the elephant in many parts of the African continent. Probably no other animal attracts such public concern as elephant. Study on the African Elephant Ivory Trade—by Iain Parker quoted in IUCN Bulletin shows that ivory, like gold, is a commodity which may be traded as a "currency equivalent". It has been estimated that world import of African ivory by Belgium, Federal Republic of Germany, France, Hong Kong, Italy, Japan, Singapore, Spain, Switzerland and U.S.A. during 1950-1978 as 1,43,89,813 Kg with an average annual figure of 4,96,200 Kg.

5.2 The demand for ivory remanis as great as ever, for no wholly satisfactory artificial substitute has ever been found. In recent years market value has increased many times. It attracts poachers who want to become rich overnight. A Kenya poacher in a weeks' work to get a pair of 10 Kg elephant tusk stands to make the equivalent work of 8-17 months wages. It is clear that traded ivory comes overwhelmingly from slaughtered elephants of the African countries. Kenya and Zaire are now CITES members, Kenya after losing an estimated 2/3rd of its elephant population between 1970-78 has now clamped a total ban on hunting and selling of ivory trophies. Zaire remains as the principal source of African Ivory.

5.3 African ivory coming to market far exceeds the natural mortality rate i.e. 4% of population. In order to check the illegal ivory exports it is essential for more elephant countries to join CITES and for CITES control to be rigorously administered. India can help by

(i) channelising the im and exports through a Governmental Agency to eliminate unscruplus trade

(ii) importing African ivory tusks only from those countries which are members of CITES

(iii) using bones and plastics as a substitute wherever possible.

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Birds-Eye View of Australian Birds

Two recently-established unusual bird observatories provide Australians with a chance to observe in comfort their nation's rich birdlife.

The Royal Australasian Ornithologists' Union (RAOU) opened its second 'live-in' bird observatory on Rotamah Island, in the Lakes National Park, Victoria, in April 1980.

This follows the establishment of the nation's first bird observatory, at Eyre, an isolated outpost on the south coast of Western Australia, in 1977.

The Rotamah Island observatory, although on an uninhabitated island and deep in a national park where all forms of wildlife are protected, is only 250 km (155 miles) east of Melbourne, a city of nearly 3 000 000 people.

In his first six weeks on Rotamah Island in early 1980, bird observatory warden Mr. Allan Burbidge recorded 108 bird species. He expects to expand this list as he explores every corner of the 364-ha (900-acre) island and records the migrating species as they arrive or pass over.

The two observatories, established by the RAOU without direct government finance but with advice and assistance from some government agencies, are designed to provide an informal meeting ground for amateur and professional bird watchers of all ages.

Visitors are charged $10 a night for food and accommodation. At Eyre, the observatory is housed in a restored old stone former telegraph station. On Rotamah Island, the observatory is a large weatherboard former farmhouse.

Both were helped by donations from commercial firms operating in the areas. At Rotamah, the American-Australian oil company, Esso-BHP, which exploits Australia's richest oil fields offshore in Bass Strait, provided $A20 000 to equip the observatory.

Esso-BHP has a gas pipeline coming ashore near Rotamah Island and is anxious to promote a responsible corporate image interested in wildlife conservation in its area of commercial exploitation.

RAOU leases the farmhouse from the National Parks Service. Even from the windows of the observatory, visitors can witness the activities not only of the myriad of birds but also of such animals as kangaroos, which feed nearby at dawn and dusk.

On Rotamah Island the range of birds is vast in size, habitation, and range. They vary from huge flightless emus—Australia's largest bird—which roam with the kangaroos around the observatory to one of the nation's smallest birds, the tiny thornbill, which weighs about 8 g ($\frac{1}{4}$ oz). There are sedentary Australian magpies, which live around the observatory, to curlew sandpipers, which leave each autumn for the long flight to their northern summer grounds in Siberia.

Twelve people can be accommodated at the Rotamah Observatory. Activities range from trapping and banding birds, mapping the territories of species and individuals, and recording the times of arrivals and departures of migrating species.

School nature classes are being invited to include weekends at Rotamah as part of their curriculum.

"An important aspect of this observatory is that it provides a venue where amateur and professional bird watchers can meet, get to know and respect each other and their interests, and work together," says Mr. Burbidge, a graduate in science, majoring in biology, from Flinders University, South Australia.

—By Courtesy Australian Information Service.

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Ecosystem of Butterflies in a Region

By

Sasadhar De

Santiniketan—731235, Birbhum, W. Bengal (India)

Abstract

In this paper, the ecosystem of butterflies in a particular region is mathematically analysed.

1. INTRODUCTION

A butterfly originates from egg (caterpillar) stage. This is named according to its genus, species and race. The caterpillars of different species take leaves as food from different kinds of trees available in the region. Birds and lizards destroy large number of caterpillars. With time the food for a particular caterpillar species also becomes rare. Each species of a butterfly after origination (in different climatic conditions and in the altered condition of the foodstuff) reaches its maximum value for a certain time of the year and then gradually decreases and reaches again to its peak value after a definite interval of time. The male dies soon after mating and the female lives in a favourable environmental condition but their life span is limited.

Thus, it is found that the density size of a species reaches its maximum at a time of the year and then gradually decreases and rises again to reach its maximum value after a definite interval of time. The peak value, of course, depends on the newly born insects which can survive. When species I decreases, species II increases and when species II decreases, species III increases and so on. In this way ecosystem is maintained. I shall present here a mathematical analysis to study such ecosystem of insects in a particular region.

2. FORMULATION AND MATHEMATICAL CONCEPTS

The number of species in a given area may remain constant from year to year or may fluctuate. Females of a species produce a large number of eggs from which caterpillars are generated but only a limited number will survive. The rate of growth of the insects of a particular species can simply be represented by

$$\frac{dx}{dt} = ax - (\text{death} + \text{loss due to other factors}), \tag{1}$$

where x = total number of insects, a = constant

If 'a' denotes the specific birth rate and b the specific loss rate of a particular species, we have

$$\frac{dx}{dt} = (a - b)\, x, \tag{1a}$$

from which we get

$$x = x_0\, e^{(a - b)\, t}, \tag{2}$$

where x_0 is the population size at the beginning ($t = 0$).

If $a < b$, the population size decreases and will die out.

If, however, we introduce the immigration of individuals at a constant rate, equation (1a) can be written as [1]

$$\frac{dx}{dt} = -\alpha x + \delta \quad (\alpha > 0,\ \delta > 0) \tag{3}$$

where $\alpha = b - a$ and δ = number of individuals per unit time.

The solution of equation (3) is

$$x = x_0\, e^{-\alpha t} - \frac{\delta}{\alpha}(e^{-\alpha t} - 1). \tag{4}$$

In such a case, if $t \to \infty$, $x \to \delta/\alpha$

Butterflies appear in their largest numbers when there has been an abundance of larval foodstuff, i.e. when there are plenty of young green leaves and shoots, and when the weather conditions are suitable. The favourable weather condition for different species of butterflies is different. Hence we have this study.

3. MATHEMATICAL ANALYSIS OF ECOSYSTEM

The total population density of butterflies of various species in a fixed interval of time, T can be wrirten as

$$m(T) = x_1\, e^{-\alpha_1 t_1} + x_2\, e^{-\alpha_2 (t_2 - t_1)} + \ldots\ldots\ldots\ldots\ldots + x_n\, e^{-\alpha_n (t_n - t_{n-1})} \tag{5}$$

$t_1 = 0$ is the starting time of each interval and $t_1 + t_2 + t_3 + \ldots\ldots\ldots\ldots + t_n = T$.

Here m = total number of butterflies and x_j represent the particular species at the initial stages. m is periodic with peroid T.

Just at the starting of the interval or year ($t \to 0$), the first term attains its peak value and as t_1 increases and tends to t_2, this term decreases and the second term increases and so on. It is further to be noted that males first die after mating. We assume that each female

species has a single breeding time during the interval, breed in a fixed time of the year from which a large number of butterfles are generated and the adult females which breed in a particular time die before the next. We further assume that $Y_{j1}, Y_{j2}, Y_{j3}, \ldots\ldots\ldots\ldots, Y_{ji}$ be the number of adult females of the species at the start of the breeding time in the first, second, third,....., ith interval/year. If each female produces on the average R_j female offspring which survive to breed in the next interval/year, by the recurrence relation, we can write

$$Y_{j\,(i+1)} = R_j \; Y_{ji} \tag{6}$$

(for i = 1, j = 1, 2,....., n; i = 2, j = 1, 2,..... .. .., n, etc.)

Thus the change in the population of a single species in one year is

$$\begin{aligned} \triangle Y_{1i} &= Y_{1\,(i+1)} - Y_{1i} \\ &= (R_1 - 1)\; Y_{1i} \end{aligned} \tag{7}$$

where $R = f\,(Y)$

and $$Y_{j\,(i+2)} = Y_{j\,(i+1)} \quad f\,(Y_{ji}). \tag{7a}$$

Assuming a solution

$$Y_{ji} = \beta_j \; \lambda_j^{i}\ , \tag{8}$$

where β_j and λ_j are constants, we get

$$\lambda_j = R_j \tag{9}$$

and from the initial conditions, we further get

$$\beta_j = Y_{ji} / R_j \tag{10}$$

Thus, we have

$$Y_{ji} = Y_{j_1} \; R^{\,i-1} \tag{11}$$

After the ith interval/year, the total population density can now be simply written as

$$m\,(T_i) = Y_{1i}\, e^{-\alpha_{1i}\, t_1} + Y_{2i}\, e^{-\alpha_{2i}\,(t_2 - t_1)}$$

$$\ldots\ldots + Y_{ji}\, e^{-\alpha_{ni}\,(t_n - t_n - 1)} + \ldots\ldots\ldots\ldots\ldots\ldots$$

$$= Y_{11}\, R_1^{\,i-1}\, e^{-\alpha_{1i}\, t_1} + Y_{21}\, R_2^{\,i-1}\, e^{-\alpha_{2i}\,(t_2 - t_1)}$$

$$+ \ldots\ldots\ldots\ldots\ldots + Y_{j1}\, R_j^{\,i-1}\, e^{-\alpha_{n}\, i\,(t_n - t_n - 1)} \qquad (12)$$

Thus, knowing the initial size of the population, the reproductive rate R_j and the number of generations, we can find the population size at any time t from the above equation. It is, however, obvious from equation (12) that for α_{ij} = constant, if $R_j > 1$, the population size increases and if $R_j < 1$, the population size will decrease. However, if $R_j = 1$, the population will follow the same pattern year after year. The peak value of the total population will depend on the number of individuals of the new-born species.

If the time lags $t_2 - t_1$, $t_3 - t_2$, $t_4 - t_3$ are small, a sharp peak will appear at first due to the combination of four species. The sharp peak is found to be different for different regions [2]. But cases where different species have bred together are extremely rare.

Acknowledgement

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Vanishing Glory of Shivpuri District
The Great Indian Bustard

CHORIOTIS NIGRICEPS (VIGORS)

BY

R.K. SHUKLA, I.F.S.

Divisional Forest Officer, Shivpuri, Madhya Pradesh

Thoughtless pursuit of dubious notions of development, causing wicked plunder of Forests and pasture lands, has been immensely responsible for inflicting incalculable damage to most of the priceless heritage 'Flora and Fauna' of our country.

The Great Indian Bustard (*Choriotis nigriceps*) (vigors) is one of the victims and is nearing extinction. Wrongly or rightly the false notion of Great Indian Bustard's meat being a potent source of 'aphrodisiacs' prevailed in many parts of the globe resulting in its victimisation by trigger happy sportsmen or poachers.

Habits and Habitat of the Great Indian Bustard

Only countable places of Indian subcontinent possess this vanishing glory. In Madhya Pradesh, two places have been identified where this endangered and vanishing bird is surviving in its natural habitat. Ghatigaon Range of Gwalior Division and 'Fatehpur-Kharicha-Dihayala' zone in Karera Range of Shivpuri Forest Division are the two proud abodes of the Great Indian Bustard. Being associated in Shivpuri District as Divisional Forest Officer, the habits and habitat of this bird were studied in field by keeping constant vigil. About six villagers are involved as 'watchers'. Lot of enthusiastic response was forthcoming from people around.

Locally it is called as 'Hunk' due to its shrill bellow. People also tell tales of 'SON CHIRAIYA' by associating this bird. Easily it is about a metre tall. Cock is taller and heavier than hen. It feeds on insects, grass hoppers, beetles, lizards, grains and even green shoots of field crop. Brownish grey coloured feathers with finely vermiculated darker shade, measure about 2½ meters when stretched. Black crested crown is conspicuously attractive. White outstretched neck and underparts, black crown and gorget are prominently visible, while in flight. Although heavy and cursorial, it is a sturdy runner like Ostritch but capable of flying to a distance of 1½ to 2 Kms. at a stretch, with rhythmic flapping at short notice. Bold enough, before local cattle, sheep and goats, graziers and passers by but highly shy to see unusually dressed city dwellers. Its peculiar behaviour of 'camauflaging' with the environment and 'freezing' motionless, to the extent of dodging on lookers and observers to a considerable degree, has been noticed on a number of occasions. Reported life span being

about well over twenty years and maturity age being four years. This bird could develop its progeny to a considerable safe number but due to its foolish practice of laying a single egg only in the open grassy land, unhidden, shelterless and unprotected, leads to its slow growth rate. Instances are not uncommon when eggs have been deserted by the female birds due to various reasons, including their own carelessness.

In 1939 Forest Commissioner H. Seiwert observed and established for the first time the strange courtship behaviour of Bustard in Europe and termed it as 'metamorphosis'. The swollen throat with inflated air sac and intricate arrangement of various feathered areas, make the courting bustard appear like a huge blossom due to strange 'reversing' of the wings. Such courtship behaviour of the 'Great Indian Bustard' is based on visual effect being perceived from a distance by female birds which are attracted during mating season. Unlike Kori bustards, the Great Indian Bustards are polygamous and generally do not live in pairs except in mating season. Breeding is the business of only the female bird.

Practical Observations on Natural and Artificial Modes of Incubation.

On 5th August 1980 one of my colleagues, Mr. Hasan happened to lay his hands on a deserted egg through a villager named Jagdish Singh of Fatehpur who traced one bustard egg. A strict watch for over a night and a day from a respectable distance was kept but the female bird did not return for incubation. Obviously it being a deserted egg, was then kept for being hatched through domestic brooding hen but it did not hatch even after 25 days' incubation and got degenerated. Initial weight of 88 Gms. of this egg was reduced to only 25 Gms. by 28.8.80. Thus the experiment on lines of Grzimeck, done in 1964 did not bear fruit here, perhaps due to long time lag or bad handling earlier or some other reason.

Around 10th August 1980 another egg was reported to be seen by my watchers Chandrabhan Singh and Mahatam of Fatehpur village. The female bird was seen hatching it. The egg was about $2\frac{3}{4}'' \times 2''$, elliptical in shape and olive green or grey green brownish flecked in colour. The incubation was carried out in nature by the mother bird in the bushy and bouldery terrain sustaining bushy ziziphu[s] shrub and grass, by sitting on the egg for nearly 16 to 18 hours a day, till 27.8.80 when at 14.00 hours a chick of speckled coat, capable of camaflauging in the granitic bouldery and scrubby terrain, was born. The mother bird was seen with the chick for about three days almost there or near about and had been affording all out protection to the new bird from kites, eagles and other scavengers around. On 31.8.80 the chick vanished with the mother bird in the adjoining 'Til Field' where adequate green cover was available for rearing up. Thu[s] a new entrant in the family of this vanishing bird was seen by me in Fatehpur—Kharichara—Dihayala tract which is surrounded by cornfields, water tanks, small hillocks and grass lands.

Another broken egg shell was located in one of the "Jwar fields" near the tank area on 28.8.80 by me, Hasan and Naik. In this way, out of three eggs, only one bore fruit and the other two did not. May be that the eggs were touched and disturbed by local people unwittingly or out of curiosity or due to some unknown reason and the female bird deserted them. It is estimated on the basis of the number of eggs seen in this tract and the reports of the 'watchers' and my personal observations that in Fatehpur-Kharichara zone of Shivpuri Division about ten birds may be easily surviving today.

Fatehpur-Kharichara tract housing this endangered species, falls in between two rivers 'Sindh' and 'Mahuar' of Shivpuri District. Obviously after the field crops are reaped, grass is dried up and water goes dry in the nearby tanks, the groups of this magnificent creature may be occasionally seen near available water sources of Sind or Mahuar rivers. At the onset of rains, on the break of monsoon, when the grasslands and farmlands are clothed with green vegetation, the concentration is shifted to the village site where the breeding and rearing up take place for years.

Past observations have indicated that the breeding of this bird in captivity has not yielded encouraging results despite repeated attempts. Lots of eggs in nature having been deserted each year by female birds and the species being peculiar to lay only one egg once a year, some extraordinary measures have to be adopted for its progeny. It is therefore suggested that the temperature of one of the female birds be recorded during mating season and whenever such occasion arises to come across any such egg in nature, being deserted by the female bird, under one pretext or the other, the same may be subjected to artificial hatching under regulated thermal incubator. The chick, if born, may be reared up by feeding small living insects, grass hoppers etc. Although this process of rearing up the chicks, would entail longer painstaking task to the ornithologist but his perseverence and zeal would surely go a long way in saving the progeny of this uncommon and vanishing species. Once it grows to the stage of affording self-protection, it may be released in nature.

Conservation Strategy

Conservation, a well known phenomenon, aims at such balanced management of biosphere that it may yield highest sustainable advantage to the existing generation together while it ensures maintenance of potential at hand, for the needs and aspirations of future generation. Thus conservation is positve, embracing preservation and utilisation, restoration and enhancement of natural environment. The living resource component of this, is renewable if conserved and is destructible, if not. Conservation of living resource safeguards the ecological processes and genetic diversity essential for life support system.

It would not be correct to accept that such problems of affording protection to endangered species like Great Indian Bustard, would readily meet with proper response.

Reason is simple. From those whose survival is precarious and whose prospects of even temporary prosperity are bleak, sympathetic response cannot be anticipated. They are bound to subordinate this cause in view of personal factors and selfishness involved. For action necessary to cure the most serious conservation problems and to prevent still worse to follow 'considerable time' would be required for planning, education, training better organisation and research and when such integrated effort is pooled up 'time' again is necessary for the biosphere to respond and ecosystem to sustain the developmental steps.

Even National and International capacities, for conservation are fragmented to various sectors like Forestry and Fishing, Agriculture and Industry, and so on and so forth. Apparently one finds, in the process, duplication of effort, gaps in coverage, internal conflicts, external criticism, and as a result the living resource even after being on the verge of extinction, gets degraded and destroyed under the garb of 'human-development-oriented-projects'. Unless it is based on ecological, environmental, social, cultural and ethical considerations, the so called developmental activities would table undesirable effects in near future.

Sound conservation and effective protection on legal, social and recreational aspects are subjected to test check for all kinds of diminishing life and the requirement for the Great Indian Bustard could not be an exception. 'Significance' 'Urgency' and 'Irreversibility' are the three vital ingredients for test checking tne priority of the issue.

'Significance' is determined by satisfying the need and objectives affecting particular class or sector of people.

'Urgency' is a function of the rate at which an important problem would get worse if the requirement is not met. Time has also to be assessed as necessary for meeting the objective.

'Irreversibility' is the pivot on which the vulnerability would hing. Highest priority is given to significant, urgent requirements to prevent further irreversible damage to the diminishing living resource to ward off its extinction.

To the first question in regard to the Great Indian Bustard, the reply covers 'recreational aspects' at not only the national level but also is of a paramount importance to the international forum.

To the second question of 'Urgency' the answer prompts the naturalists to do the needful at once and with a full swing.

To the third question of 'Irreversibility' it is clear that if this endangered species is wiped out due to nonattachment of proper and timely significance and urgency to the task force, then the dark days of irreversibility would not be far.

To achieve the basic objective, the only alternative, left behind, is the environmental planning which has to start under an integrated policy framework of rural based conservation strategy, blended with suitable legislation and organisation, training and research, participation and education, publicity and pantology. The golden days would then await the hidden agrarian panorama to survive and thrive for perpetuity. This hidden treasure of Shivpuri district would then be a potent source of recreation to mankind for all time to come.

———

The Kheri Maneaters

(*Continued from Cheetal, Vol. 21, No. 2 & 3, Page 77*)

"Faint heart never won fat woman", Mr. Choudhary.

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It was not Elsa's cub, but Ugas, a lion actor from 'Born Free' who killed his keeper, allegedly due to ill treatment.

Arjan Singh

———

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All donations will be gratefully acknowledged and the names of donors published in CHEETAL

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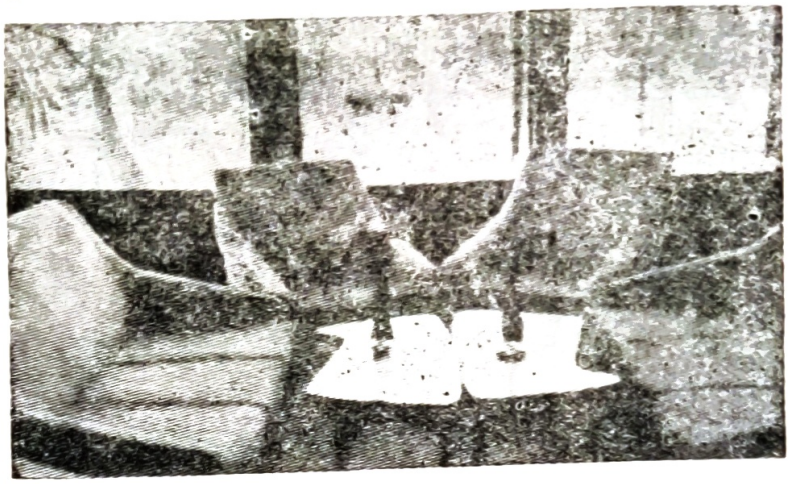

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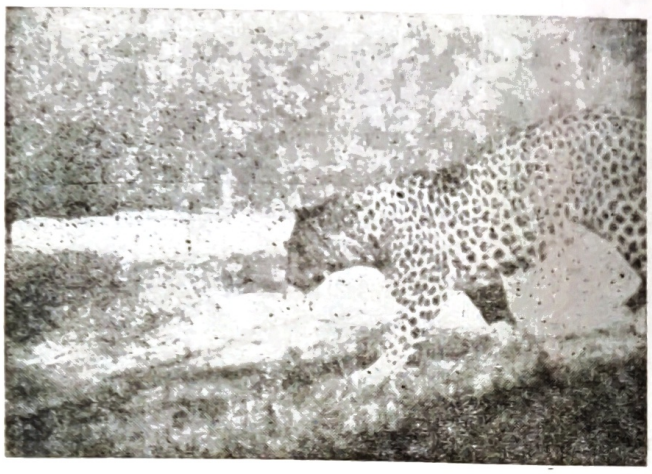

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(c) To assist in enforcing and actively supporting the Forest Acts, Wild Birds and Animals Protection Acts and Rules etc. of States and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detection and prosecution of offenders in respect of such laws.

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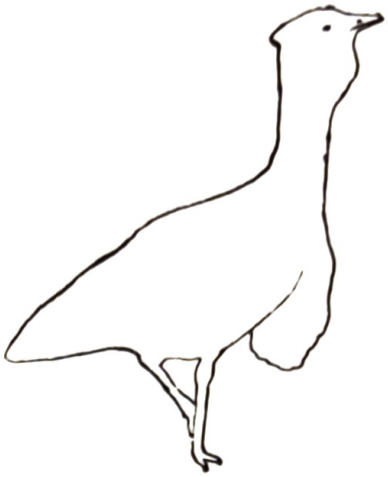
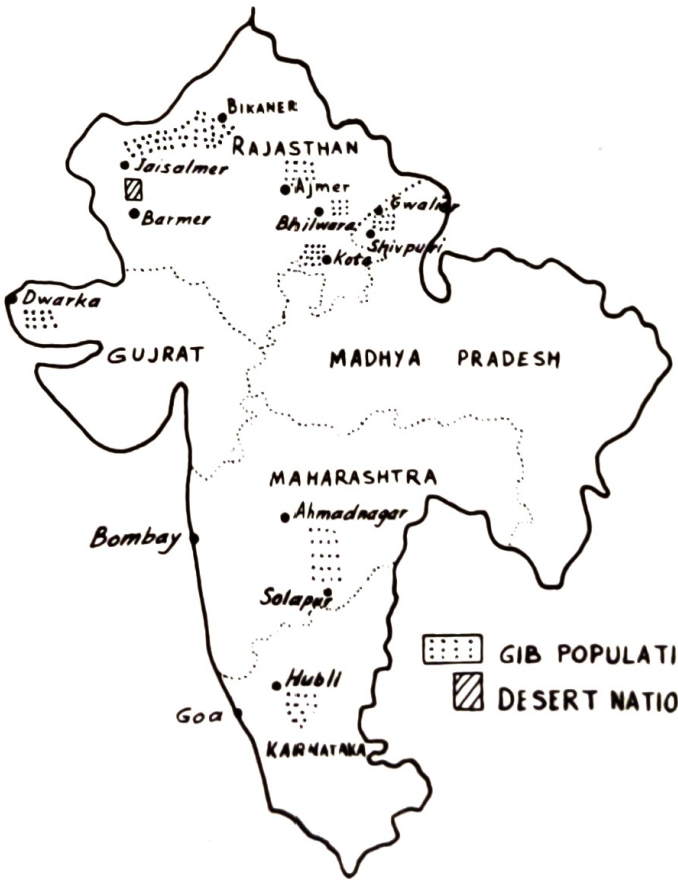
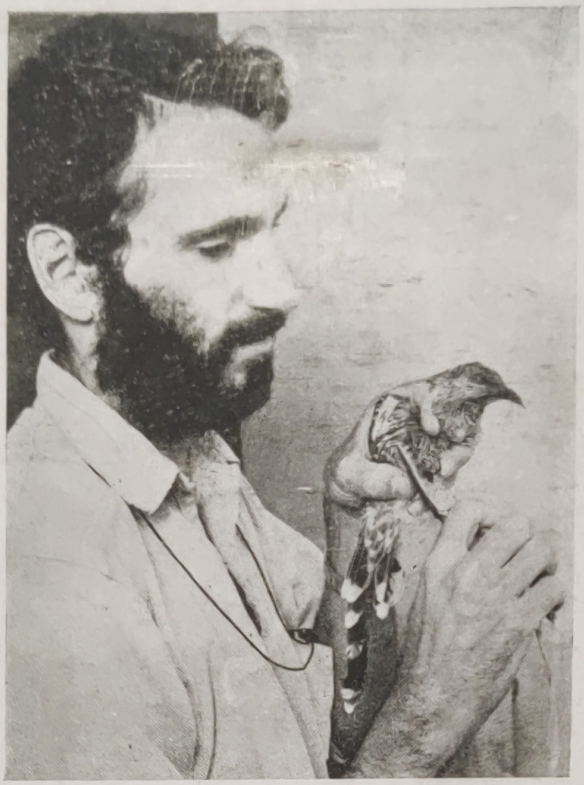
Great Indian Bustard



Australian Bustard in courtship dance pose



(See Article on Page 3)



Mr. Allan Burbidge bands a Little Wattle Bird caught near the observatory on Rotamah Island.

(*See article on Page 30*)

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		Monochrome Prints	*Colour Slides*
I Prize	...	Rs. 500.00	Rs. 1000.00
II Prize	...	Rs. 300.00	Rs. 750.00
III Prize	...	Rs. 200.00	Rs. 500.00
Consolation Prize	...	Rs. 100.00	Rs. 250.00

Closing Date: 31st December, 1980.

For further information contact:

The Honorary Secretary
Wildlife Preservation Society of India
7, Astley Hall, DEHRA DUN (U.P.)

Edited by ... Dr. P. N. Misra, Hony. Secretary for the Wildlife